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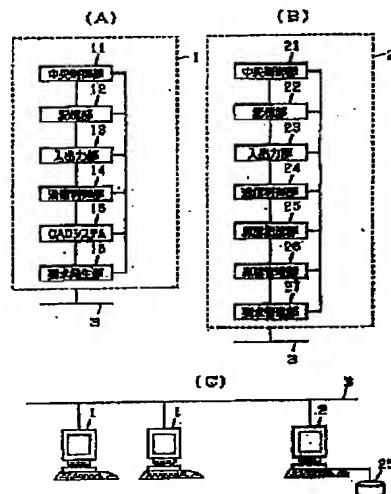
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(54) 【発明の名称】 図面管理装置

(57) 【要約】

【課題】 複数の設計者が、変更内容が競合することなく、同一の図面を並行して修正できるようにした図面管理装置を提供する。

【解決手段】 出図依頼部門側装置1から原図データの取り出し要求があると、図面管理部門側装置2の要求管理部27は、その図面に対して要求された修正レベルで、他に取り出し要求に応じているか否かを調べ、同一の修正レベルでないことを確認し、原図記憶部25から原図データを出図依頼部門側装置1へ転送する。各出図依頼部門側装置1では、異なる修正レベルでの修正を並行して行うことができる。出図依頼部門側装置1から図面データの出図要求があると、図面管理部門側装置2の要求管理部27は、正当な出図要求であることを確認後、図面データを原図記憶部25に原図データとして格納し、その修正レベルでの取り出し要求を可能にする。



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【特許請求の範囲】

【請求項1】 CADシステムで作成された図面を管理する図面管理装置において、前記図面を格納する原図格納手段と、前記図面を取り出す際の修正レベルを保持する修正要求保持手段と、前記図面の取り出し要求を受け付けて該要求の修正レベルと前記修正要求保持手段に保持されている修正レベルを比較して同一修正レベルでない場合に前記原図格納手段から前記図面を取り出す管理手段を具備し、同一図面に対する修正レベルの異なる複数の取り出し要求を受け付け可能に構成したことを特徴とする図面管理装置。

【請求項2】 前記修正レベルは、修正あるいは改版の内容または図面の構成要素の意味に応じて区分されていることを特徴とする請求項1に記載の図面管理装置。

【請求項3】 前記管理手段は、同一図面に対して2以上の修正依頼を受け付けた際に、すべての図面の修正あるいは改版の受付が完了するまで先に受け付けた図面の修正あるいは改版を保留し、原図データに反映しないことを特徴とする請求項1に記載の図面管理装置。

【請求項4】 さらに、同一図面に対する2以上の修正あるいは改版を合成する合成手段を有し、前記管理手段は、同一図面に対して2以上の修正依頼を受け付けた際に、すべての図面の修正依頼の受付が完了するまで先に受け付けた図面の修正あるいは改版を保留し、すべての図面の修正依頼の受付が完了後に前記合成手段による合成を行なって前記原図格納手段に格納することを特徴とする請求項1に記載の図面管理装置。

【請求項5】 前記管理手段は、同一図面に対して2以上の修正依頼を受け付けた際に、先に受け付けた図面の修正依頼がそれ以降の変更内容と競合するか否かを判定し、競合しない場合に先に受け付けた図面の修正依頼に基づく修正あるいは改変をそれ以降の図面の修正依頼の受付を待たずに前記原図格納手段内の図面に反映することを特徴とする請求項1に記載の図面管理装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、CAD（計算機利用設計）システムで作成された図面を電子情報のまま保管し、管理する図面管理装置に関するものである。

【0002】

【従来の技術】近年、CADシステム等の発達により、CADシステムを用いて作図作業を行ない、かつ、その管理も電子情報のままで行なうようになってきている。そのため、図面間の関連も電子情報で管理することが可能となっている。出図された図面は、単に保持、管理されるだけでなく、後日、修正あるいは改版（以下、修正等という）される場合があり、図面管理装置はこれに対応する必要がある。

【0003】例えば、特開平4-225473号公報では、図面に対して修正等を行なった場合に、その図面と

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関連する他の図面を自動検索する機能を実現している。また、特開平6-83882号公報では、同様に修正等が発生した場合に、世代管理を行なって、不正な図面の修正を防止するようにしている。

【0004】他方、文書管理の分野では、複数ファイルを組み合わせた大規模な文書等を複数人で作成するような場合に同一のファイルを複数人が読み出しあるいは書き込み可能になるように構成されている場合が多い。その際には、1人があるファイルを書き込み可能で開いた場合には、他の者は、読み出ししかできないように排他制御をすることが通常行なわれている。また、近年はグループウェアに見られるように、共有ファイルを複数人が同時にアクセスすることを許可し、さらに、複数人が行なった変更を全ての人に反映するようなことも行なわれている。

【0005】このような機能を図面管理装置に適用することを考える。すなわち、複数の設計者が図面の修正等を分担して行なうという行為を、CADシステムで作成された図面を電子情報のまま保管、管理する図面管理装置上で実現することを考えた場合、文書管理と同様に、ある設計者が修正等の目的のために図面を転記した時点で、他の者が修正等を行なえないように排他制御を行なうと、最初の設計者が修正等を完了するまでは次の者の修正等は開始できないこととなり、全ての修正が完了するまでに多大な時間がかかってしまうこととなる。また、通常、図面管理装置上にある原図データの修正等を行なう場合は、一旦各設計者のワークステーションに転記して、そのデータに対して修正等を行なうのが通例であって、複数の設計者が同一のデータに対して修正等を行なうことは現実的でない。さらに、グループウェアと同様の考え方によって、データを共有して修正等を行なったとしても、変更内容の競合が発生して矛盾が起きる可能性があるという問題がある。

【0006】

【発明が解決しようとする課題】本発明は、上述した事情に鑑みてなされたもので、複数の設計者が、変更内容が競合することなく、同一の図面を並行して修正できるようにした図面管理装置を提供することを目的とするものである。

【0007】

【課題を解決するための手段】本発明は、CADシステムで作成された図面を管理する図面管理装置において、前記図面を格納する原図格納手段と、前記図面を取り出す際の修正レベルを保持する修正要求保持手段と、前記図面の取り出し要求を受け付けて該要求の修正レベルと前記修正要求保持手段に保持されている修正レベルを比較して同一修正レベルでない場合に前記原図格納手段から前記図面を取り出す管理手段を具備し、同一図面に対する修正レベルの異なる複数の取り出し要求を受け付け可能に構成したことを特徴とするものである。前記修正

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レベルは、請求項2に記載の発明のように、修正あるいは改版の内容または図面の構成要素の意味に応じて区分することができる。

【0008】前記管理手段は、請求項3に記載の発明のように、同一図面に対して2以上の修正依頼を受け付けた際に、すべての図面の修正あるいは改版の受付が完了するまで先に受け付けた図面の修正あるいは改版を保留し、原図データに反映しないように構成することができる。このとき、請求項4に記載の発明のように、さらに、同一図面に対する2以上の修正あるいは改版を合成

する合成手段を設け、前記管理手段は、同一図面に対して2以上の修正依頼を受け付けた際に、すべての図面の修正依頼の受付が完了するまで先に受け付けた図面の修正あるいは改版を保留し、すべての図面の修正依頼の受付が完了後に前記合成手段による合成を行なって前記原図格納手段に格納するように構成することができる。

【0009】さらに、前記管理手段は、請求項5に記載

の発明のように、同一図面に対して2以上の修正依頼を受け付けた際に、先に受け付けた図面の修正依頼がそれ以降の変更内容と競合するか否かを判定し、競合しない場合に先に受け付けた図面の修正依頼に基づく修正あるいは改変をそれ以降の図面の修正依頼の受付を待たずに前記原図格納手段内の図面に反映するように構成することができる。

【0010】
【発明の実施の形態】図1は、本発明の図面管理装置の第1の実施の形態を含むシステムの一例を示す構成図である。図中、1は出図依頼部門側装置、2は図面管理部門側装置、3はネットワーク、11は中央制御部、12は記憶部、13は入出力部、14は通信制御部、15はCADシステム、16は要求発生部、21は中央制御部、22は記憶部、23は入出力部、24は通信制御部、25は原図記憶部、26は原図管理部、27は要求管理部である。

【0011】図1(A)に示すように、出図依頼部門側装置1は、中央制御部11と、記憶部12と、入出力部13と、通信制御部14と、CADシステム15と、要求発生部16を有する。CADシステム15は、CAD図面の作図、修正、出力等を行なう。また、要求発生部16は、図面管理部門側装置2に対して、原図データの取出要求、または修正等実施済データの出図要求を行なう。出図依頼部門側装置1は、必要に応じてネットワーク3に接続される。

【0012】図1(B)に示すように、図面管理部門側装置2は、中央制御部21と、記憶部22と、入出力部23と、通信制御部24と、原図記憶部25と、原図管理部26と、要求管理部27を有している。原図記憶部25は、原図データを保存する。原図管理部26は、原図記憶部25に対して原図データの取り出し、または格納を制御する。要求管理部27は、出図依頼部門側装置

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1の要求発生部16からの原図データの取出要求、または修正等実施済データの出図要求を受け付ける。図面管理部門側装置2は、必要に応じてネットワーク3に接続される。

【0013】上述の出図依頼部門側装置1や図面管理部門側装置2は、例えば、1台以上のワークステーション、および、それらの上に実装されたソフトウェアによって構成することが可能である。このようなワークステーションによる構成例を図1(C)に示している。図1(C)では、2台の出図依頼部門側のワークステーションと、1台の図面管理部門側のワークステーションがネットワーク3によって接続された構成を示している。この構成は、一例であって、ワークステーションの台数などは適宜変更可能であるし、必ずしもネットワーク3に接続されている必要はない。また、この例では、ワークステーション、および実装されるソフトウェアは、出図依頼部門側にあるもの、および、図面管理部門側にあるものに大別されている。しかし、使用状態によっては必ずしも独立している必要はなく、1台のワークステーションに出図依頼部門側の構成と図面管理部門側の構成が含まれ、共通部分を共用した構成であってもよい。

【0014】図2は、本発明の図面管理装置の第1の実施の形態を含むシステムの動作の一例の説明図である。図中、図1と同様の部分には同じ符号を付してある。31はユーザインタフェース、32は処理制御部、41はユーザ認証部、42は図面存在確認部、43は修正要求確認部、44は修正要求登録部、45は修正要求登録ファイル、46はエラー通知部、47は処理制御部である。この例では、出図依頼部門側装置1の要求発生部16は、ユーザインタフェース31および処理制御部32を有している。また、図面管理部門側装置2の要求管理部27は、ユーザ認証部41、図面存在確認部42、修正要求確認部43、修正要求登録部44、修正要求登録ファイル45、エラー通知部46、処理制御部47を有している。

【0015】ユーザインタフェース31は、設計者からの原図取出要求、図面出図要求の各指令を受け取る。処理制御部32は、図面管理部門側装置2に対して指令の転送、エラー通知の受取を行ない、図面管理部門側装置2から転送された原図データを記憶部12に格納し、出図する図面データを記憶部12から図面管理部門側装置2に転送する等の処理を行なうように、装置内部の各部の起動、および制御を行なう。

【0016】ユーザ認証部41は、図面管理部門側装置2に送られてきた要求元の設計者名が、適切な者か否かの認証を行なう。図面存在確認部42は、図面管理部門側装置2に送られてきた指定された図面名が、原図データとして存在しているか否かの検出を行なう。登録要求確認部43は、修正要求が当該図面に対して同一設計者名、あるいは同一レベルか否かの検出を行なう。修正要

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求登録部44は、修正要求登録ファイル45に対して、修正要求のあった設計者名、図面名、修正レベルの登録、および呼出しを行なう。エラー通知部46は、発生したエラーを出図依頼部門装置1に転送する。処理制御部47は、要求管理部27内部の各部の起動、および制御、および外部との接続を行なう。

【0017】次に、出図依頼部門側装置1に原図取出要求の指令を出した場合の動作について説明する。図3は、原図取り出し要求時の表示画面の一例の説明図である。出図依頼部門側装置1の要求発生部16中のユーザインタフェース31は、例えば、図3に示すような指示入力画面を設計者に提示し、指示を受ける。設計者は、図3に示した画面表示に従い、設計者名、パスワード、取り出したい図面名、修正を行なうか否かの選択、修正する際の修正レベルを入力して開始の指示を行なう。

【0018】修正レベルは、修正等の内容、または図面の構成要素の意味に応じて区分されている。図4は、修正レベルの一例の説明図である。この例では、修正レベルとして、誤記訂正、属性変更、内容修正の3レベルを想定している。それぞれの修正レベルは、図4に示すように、修正等の内容によって区分されている。誤記訂正は、注記文字の誤記訂正を行なう場合の修正レベルである。属性変更は、図面名や部品番号など、図面の属性の修正や訂正を行なう場合の修正レベルである。内容修正は、図面中の回路図自体の修正や内容の変更を行なう場合の修正レベルである。

【0019】図5は、修正レベルの別の例の説明図である。この例では、図面の構成要素の意味に応じて修正レベルを設定している。図5(B)に示すように、テキスト文字のみの修正レベルでは、図5(A)に点線で囲んで示されているテキスト部分の修正を行なう。特定図形の属性の修正レベルでは、図5(A)に「属性」として示されているような、図面枠などの特定の図形に付加されている属性の変更や修正を行なう。ラベルのみの修正レベルでは、図5(A)の回路図中に「ラベル」として示されているように、回路図に付加されている文字の変更や修正を行なう。図形の変更の修正レベルでは、回路図の修正や内容の変更を行なう。この例では、文字の修正であっても、注記部分のようなテキスト部分と、ラベル部分とは異なる修正レベルによって修正を行なうことになる。

【0020】もちろん、図4、図5に示した例のほか、種々の修正レベルを設定することが可能である。設計者は、これから行なう作業に応じて、例えば、図3に示す画面において修正レベルを設定する。また、修正レベルは、修正の内容に応じ同時に複数のレベルを選択できるように構成することも可能である。

【0021】設計者から開始の指示がなされると、出図依頼部門側装置1から図面管理部門側装置2に対して、入力した情報が原図取出要求として要求管理部27に転

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送される。

【0022】図6は、原図取り出し要求時の要求管理部27の動作の一例を示すフローチャートである。要求管理部27の処理制御部47は、S51において、ユーザ認証部41に対してユーザ認証を行なう旨の指示を与える。ユーザ認証部41は、送られてきた設計者名が原図データを取り出す正当な権利を持つ者か否かを認証する。当該認証のための権利者の情報は、ファイルその他の情報によって与えられるとする。S52において認証の結果を判定し、設計者名が適切でなかった場合は、ユーザ不正のエラーである旨をS61でエラー通知部46に伝える。そうでない場合は以下の処理を続行する。

【0023】要求管理部27の処理制御部47は、図面存在確認部42に対して、図面名の存在確認をする旨の指示を与える。処理制御部47は、送られてきた図面名が原図データとして存在するか否かを検出する。この検出のため、処理制御部47は、原図管理部26に対して原図データ名のリストを要求し、原図管理部26より原図データ名のリストを入手する。S53において、検出の結果、図面名が原図データとして存在しないものであった場合は、図面名不正のエラーである旨をS61でエラー通知部46に伝える。そうでない場合は以下の処理を続行する。

【0024】要求管理部27の処理制御部47は、S54において、修正要求確認部43に対して、送られてきた図面名の原図データに対する修正要求が既に存在するものであるか、さらに、修正要求が既に存在したものであった場合は、当該修正要求者が既登録設計者に含まれるか否か、さらに当該修正要求が既登録設計者でない者であった場合は、前記修正する際の修正レベルが同一であるか否かの検出を行なう旨の指示を与える。この検出のため、処理制御部47は、修正要求登録部44に対して修正要求登録ファイル45中の既登録設計者のリストを要求し、修正要求登録部44より既登録設計者のリストを入手する。この検出の結果、S55において、図面名の原図データに対する修正要求がまだ存在しなかった場合は、S58以降の修正要求登録の処理を続行する。修正要求が既に存在し、S56において修正要求者が既登録設計者であった場合は、登録重複エラーある旨をS61でエラー通知部46に伝える。さらに、修正要求が既に存在し、当該修正要求者が既登録設計者でなく、S57において修正レベルが同一である場合は、レベル重複エラーある旨をS61でエラー通知部46に伝える。そうでない場合は以下に述べる修正要求登録の処理を続行する。

【0025】修正要求が妥当なものと判断された場合は、S58において、要求管理部27の処理制御部47は、修正要求登録部44に対して当該修正要求を登録する旨の指示を与える。修正要求登録部44は、修正要求登録ファイル45に修正要求を登録する。さらに、要求

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管理部27の処理制御部47は、S59において、原図管理部24に送られてきた図面名の原図データを転送する旨の指示を与え、S80において、原図管理部24は、原図記憶部25から出図依頼部門側装置1に対して当該原図データを転送する。

【0026】出図依頼部門側装置1に転送された原図データは、要求発生部16の処理制御部32によって記憶装置12に格納される。以上の処理を経て、設計者は原図データを取り出し、原図データに対して修正等を施すことができるようになる。

【0027】なお、図8のS58において、送られてきた修正要求の要求者が既登録設計者に含まれていた場合は、これを既に存在する修正要求の訂正と見なし、既に存在する修正要求を削除し、送られてきた修正要求に置き換えることによって、修正要求の削除・訂正を行なうことができるように構成してもよい。

【0028】次に、出図依頼部門側装置1に図面出図要求の指令を出した場合の動作について説明する。図7は、出図要求時の表示画面の一例の説明図である。設計者は、例えば、図7に示すような指示入力画面に従い、設計者名、パスワード、出図したい図面名を入力して開始の指示を行なう。すると、出図依頼部門側装置1から図面管理部22に対して、入力した設計者名、パスワード、図面名などの情報が図面出図要求として要求管理部27に転送される。

【0029】図8は、出図要求時の要求管理部27の動作の一例を示すフローチャートである。要求管理部27の処理制御部47は、S71において、ユーザ認証部41に対してユーザ認証を行なう旨の指示を与え、ユーザ認証部41は、送られてきた設計者名が出図を行なう正当な権利を持つ者か否かを認証する。当該認証のための権利者の情報は、ファイルその他の情報によって与えられるとする。S72において、認証の結果、設計者名が適切でなかった場合は、ユーザ不正のエラーである旨をS78でエラー通知部46に伝える。そうでない場合は以下の処理を続行する。

【0030】要求管理部27の処理制御部47は、S73において、修正要求確認部43に対して送られてきた図面名の原図データに対する修正要求が既に存在するものであるか否かの検出を行なう旨の指示を与える。この検出のため、処理制御部47は、修正要求登録部44に対して修正要求登録ファイル45中の既登録設計者のリストを要求し、修正要求登録部44より既登録設計者のリストを入手する。S74において、この検出の結果、送られてきた図面名の原図データに対する修正要求が存在しなかった場合は、出図しようとしている図面は修正要求がなされていないものであるため、未登録エラーある旨をS78でエラー通知部46に伝える。そうでない場合は以下の処理を続行する。

【0031】S74までの処理で出図要求が妥当なもの

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と判断された場合は、S75において、要求管理部27の処理制御部47は、原図管理部24に図面データを出図依頼部門側装置1から転送する旨の指示を与え、原図管理部24は、S76において、原図記憶部25に図面データを原図データとして格納する。さらに、要求管理部27の処理制御部47は、S77において、修正要求登録部44に対して当該修正要求を削除する旨の指示を与える。修正要求登録部44は、修正要求登録ファイル45から前記修正要求を削除する。

10 【0032】このようにして、原図データの取り出しの際に1つの図面で修正レベルが重ならなければ、各修正レベルにおける原図データの取り出し、修正、出図を並行して行なうことができる。これにより、競合を起こすことなく、複数人による図面の修正が可能となる。

【0033】なお、同一図面に対して2以上の原図データの取り出しが行なわれている場合に、2以上の出図依頼部門側装置1から同一のページを修正した図面データの出図依頼を受け付けた場合、上書きされて最後に出図要求した図面データのみが残らない場合がある。このような事態を回避するため、原図管理部26は、すべての出図要求の受付が完了するまで、先に受け付けた図面の修正あるいは改版を保留し、原図データに反映しないようにする。すべての出図要求を受け付けた後、重複するページの修正が存在する場合には、その旨をページの重複する修正を行なった出図依頼部門側装置に伝え、すべての出図要求を受け付けない、あるいは1つのみを選択して受け付けるように構成することができる。もちろん、同一ページを修正しないことが明らかな場合には、このような処理を行わず、出図要求の合った順に、修正ページの図面データを原図記憶部25に格納すればよい。

【0034】図9は、本発明の図面管理装置の第2の実施の形態を含むシステムの動作の一例の説明図である。図中、図2と同様の部分には同じ符号を付して説明を省略する。81は一時記憶部、82は合成部である。上述の第1の実施の形態の構成では、同じ図面の異なるページに対して並行して修正を行なえるものの、同じページに対して修正を行なって出図を行なうと、順に上書きされて最後に出図したデータしか残らない場合がある。そのため、この第2の実施の形態では、同一ページに異なるレベルの修正が発生した場合に、図面データが上書きされてしまうことを防止し、同一ページの修正をも並行して行なえるようにした構成を示している。

【0035】図面管理部門側装置2は、さらに一時記憶部81および合成部82を有している。一時記憶部81は、出図要求のあった図面データを一時的に保持する。合成部82は、複数の出図された図面データを合成し、すべての修正内容を包含する図面データを作成する。

【0036】この第2の実施の形態における原図データの取り出しの動作は、上述の第1の実施の形態の場合と

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同様である。出図時には、出図された図面データは、直接原図記憶部25に格納されるのではなく、一度、一時記憶部81に格納される。並行して修正作業を行っていた出図依頼部門装置1からすべて出図依頼があり、当該図面に対する全ての図面データが一時記憶部81に格納されると、同一ページに複数の修正要求があったページのデータのみ、合成部82により全ての修正を包含する図面データを作成する。そして、合成後の図面データを原図記憶部25に格納する。このようにして、同一ページに対して複数人が並行して修正を行なうことができ、その場合でも、それぞれの修正内容を原図データに反映することができる。この第2の実施の形態のように図面データを合成する場合でも、同一の修正レベルでの修正は許可していない。これにより、同一箇所に対する異なる修正内容が合成される事態を防止することができる。

【0037】なお、先に受け付けた出図要求がそれ以降に受け付ける出図要求と競合しないことが明らかな場合には、すべての出図要求が揃うまで保留せずに、受け付けた出図要求を処理し、原図記憶部25に格納して行くように構成してもよい。

【0038】

【発明の効果】以上の説明から明らかなように、本発明によれば、CAD図面上の要素に対して、修正あるいは改版の内容、または図面の構成要素の意味に応じて区分されたレベル分けを行ない、前記レベルを、原図データを修正あるいは改版する際に登録し、同一レベルでの修正あるいは改版を制限することによって、変更内容の競合を起すことなく、複数人が並行して図面の修正あるいは改版を行なうことができる。

【0039】また、図面の同一ページに対して2以上の修正依頼が発生した際に、それらの修正を合成して反映することにより、同一ページに対する修正を並行して行

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*なうことができる。このとき、同一の修正レベルによる修正は禁止されているので、変更内容の競合を防ぐことができるという効果がある。

【図面の簡単な説明】

【図1】 本発明の図面管理装置の第1の実施の形態を含むシステムの一例を示す構成図である。

【図2】 本発明の図面管理装置の第1の実施の形態を含むシステムの動作の一例の説明図である。

【図3】 原図取り出し要求時の表示画面の一例の説明図である。

【図4】 修正レベルの一例の説明図である。

【図5】 修正レベルの別の例の説明図である。

【図6】 原図取り出し要求時の要求管理部の動作の一例を示すフローチャートである。

【図7】 出図要求時の表示画面の一例の説明図である。

【図8】 出図要求時の要求管理部の動作の一例を示すフローチャートである。

【図9】 本発明の図面管理装置の第2の実施の形態を含むシステムの動作の一例の説明図である。

【符号の説明】

1…出図依頼部門側装置、2…図面管理部門側装置、3…ネットワーク、11…中央制御部、12…記憶部、13…入出力部、14…通信制御部、15…CADシステム、16…要求発生部、21…中央制御部、22…記憶部、23…入出力部、24…通信制御部、25…原図記憶部、26…原図管理部、27…要求管理部、31…ユーザーインタフェース、32…処理制御部、41…ユーザー認証部、42…図面存在確認部、43…修正要求確認部、44…修正要求登録部、45…修正要求登録ファイル、46…エラー通知部、47…処理制御部、81…一時記憶部、82…合成部。

【図3】

原図の取り出し	
ユーザ名	_____
パスワード	_____
図面名(番号)	_____
修正	する [] しない []
修正レベル	[図面修正] [属性変更] [内容修正]
<input type="button" value="開始"/> <input type="button" value="取消"/>	

【図4】

修正レベル	修正内容
図面修正	発注文字の修正・訂正
属性変更	図面名・部品番号等の図面の属性の修正・訂正
内容修正	図面内容の修正・内容変更

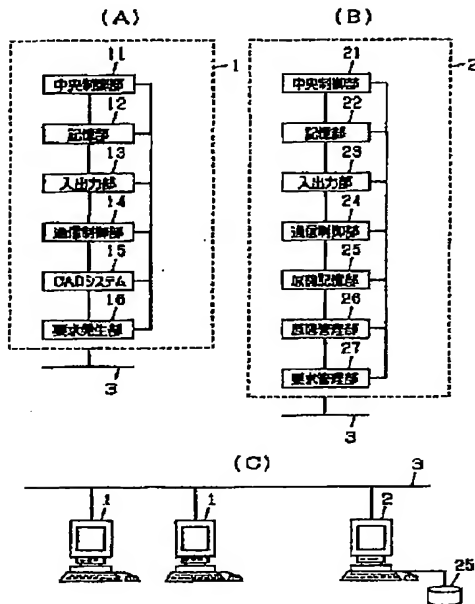
【図7】

図面の出図	
ユーザ名	_____
パスワード	_____
図面名(番号)	_____
<input type="button" value="開始"/> <input type="button" value="取消"/>	

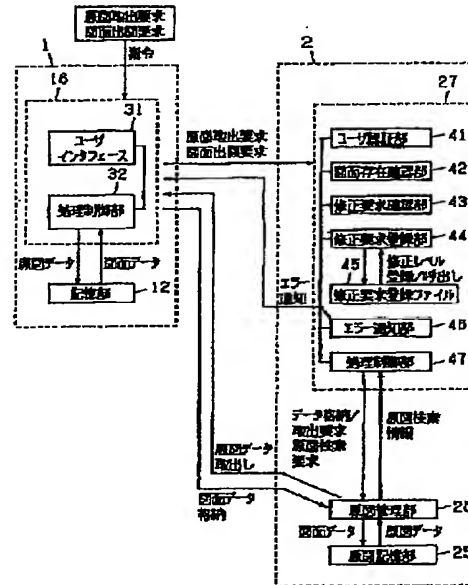
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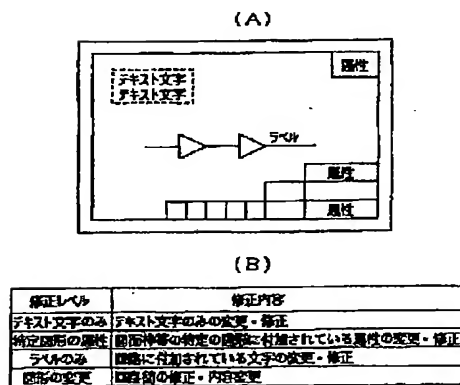
【図1】



【図2】



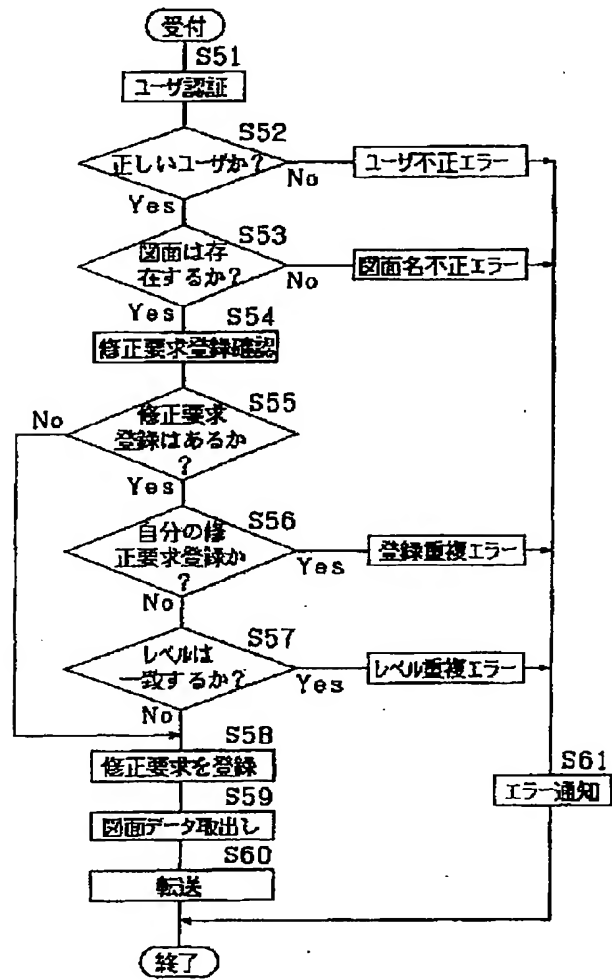
【図5】



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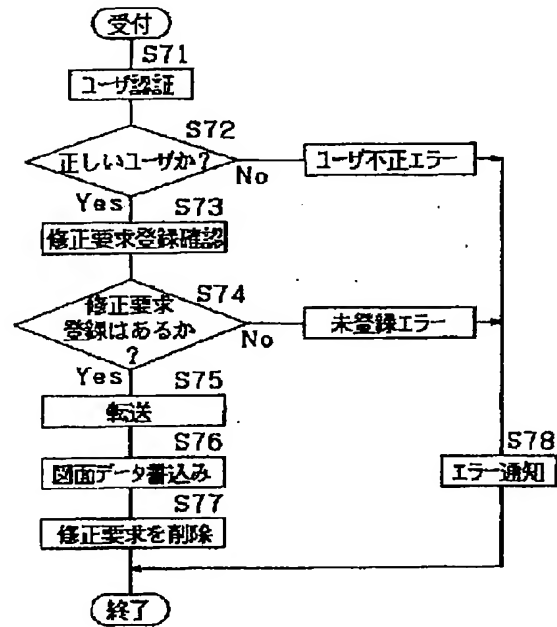
【図6】



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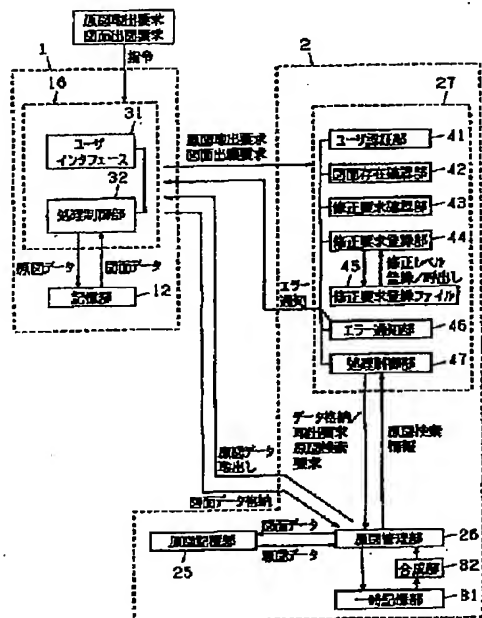
【図8】



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【図9】



PATENT ABSTRACTS OF JAPAN

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(71)Applicant : FUJI XEROX CO LTD

(22)Date of filing : 02.02.1996

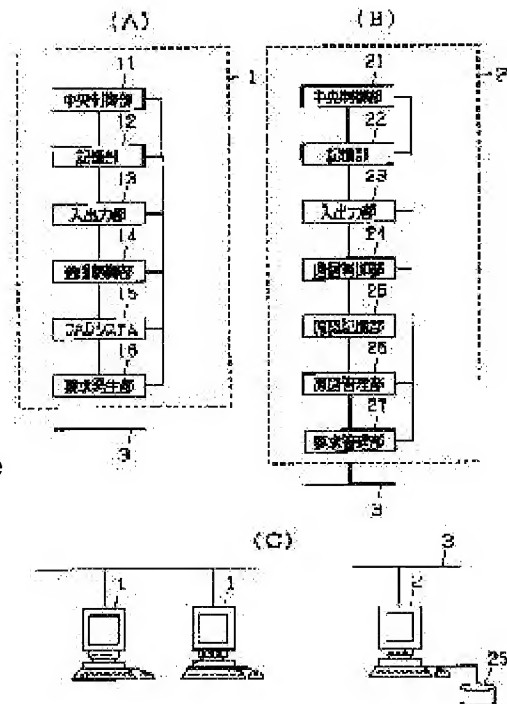
(72)Inventor : AKITA NOBORU

(54) DRAWING MANAGING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To allow plural designer to parallelly correct the same drawing without the contention of changing contents.

SOLUTION: When a release of drawing request side device 1 requests the release of original drawing data, a request managing part 27 in a drawing managing section side device 2 investigates whether or not this device is complying to another releasing request at a requested correction level with respect to the drawing to confirm the difference between the correction levels and transfers original drawing data to the release of drawing request side device 1 from an original drawing storing part 25. Respective release of drawing request side devices 1 are capable of parallelly correcting the drawing at levels different from each other. When the release of drawing request side device 1 requests the release of original drawing data, a request managing part 27 in the drawing managing section side device 2 confirms that the release of drawing request is authorized and after then the part 27 in the drawing managing section side device 2 stores drawing data i the original drawing storing part 25 as original drawing data to make it possible to request release at the correction level.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] In the drawing-control equipment which manages the drawing created by the CAD system An original-drawing storing means to store said drawing, and a request-modify maintenance means to hold the modification level at the time of taking out said drawing, The management tool which receives the ejection demand of said drawing, compares the modification level of this demand with the modification level currently held at said request-modify maintenance means, and takes out said drawing from said original-drawing storing means when it is not the same modification level is provided. Drawing-control equipment characterized by constituting possible [a receptionist of two or more ejection demands from which the modification level to the same drawing differs].

[Claim 2] Said modification level is drawing-control equipment according to claim 1 characterized by being classified according to the semantics of the content of correction or revision, or the component of a drawing.

[Claim 3] Said management tool is drawing-control equipment according to claim 1 characterized by suspending the correction or revision of a drawing received previously until correction of all drawings or reception of revision is completed, and not being reflected in original-drawing data when two or more correction requests are received to the same drawing.

[Claim 4] It has a synthetic means to compound two or more corrections or revision to the same drawing. Furthermore, said management tool When two or more correction requests are received to the same drawing, the correction or revision of a drawing previously received until reception of a correction request of all drawings was completed is suspended. Drawing-control equipment according to claim 1 characterized by performing composition by said synthetic means after completing reception of a correction request of all drawings, and storing in said original-drawing storing means.

[Claim 5] When said management tool receives two or more correction requests to the same drawing It judges whether a correction request of the drawing received previously competes with the content of modification after it. Drawing-control equipment according to claim 1 characterized by being reflected in the drawing within said original-drawing storing means, without waiting for reception of a correction request of the correction or alteration based on a correction request of the drawing previously received when not competing of the drawing after it.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing an example of a system including the gestalt of operation of the 1st of the drawing-control equipment of this invention.

[Drawing 2] It is the explanatory view of an example of actuation of a system including the gestalt of operation of the 1st of the drawing-control equipment of this invention.

[Drawing 3] It is the explanatory view of an example of the display screen of an original-drawing ejection demand.

[Drawing 4] It is the explanatory view of an example of modification level.

[Drawing 5] It is the explanatory view of another example of modification level.

[Drawing 6] It is the flow chart which shows an example of actuation of the request administrator section of an original-drawing ejection demand.

[Drawing 7] It is the explanatory view of an example of the display screen of a release-of-drawing demand.

[Drawing 8] It is the flow chart which shows an example of actuation of the request administrator section of a release-of-drawing demand.

[Drawing 9] It is the explanatory view of an example of actuation of a system including the gestalt of operation of the 2nd of the drawing-control equipment of this invention.

[Description of Notations]

1 -- Release-of-drawing request category side equipment, 2 -- Drawing-control category side equipment, 3 -- Network, 11 [-- Communications control section,] -- The CC section, 12 -- The storage section, 13 -- The I/O section, 14 15 [-- Storage section,] -- A CAD system, 16 -- The demand generating section, 21 -- The CC section, 22 23 [-- Original-drawing Management Department,] -- The I/O section, 24 -- The communications control section, 25 -- The original-drawing storage section, 26 27 -- The request administrator section, 31 -- A user interface, 32 -- Processing control section, 41 [-- The request-modify registration section, 45 / -- A request-modify catalogued file, 46 / -- The error notification section, 47 / -- A processing control section, 81 / -- The memory section, 82 / -- The synthetic section.] -- The user authentication section, 42 -- The drawing existence check section, 43 -- The request-modify check section, 44

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention keeps the drawing created by the CAD (computer-aided design) system with electronic intelligence, and relates to the drawing-control equipment to manage.

[0002]

[Description of the Prior Art] In recent years, by development of a CAD system etc., a plot activity is done using a CAD system, and it is also coming to perform the management with electronic intelligence. Therefore, the relation between drawings can also be managed by electronic intelligence. There is [the drawing by which the release of drawing was carried out is only held and is not only managed, but] correction or a case where it is revised (henceforth correction etc.) later, and drawing-control equipment needs to correspond to this.

[0003] For example, in JP,4-225473,A, when correction etc. is made to a drawing, the function which carries out automatic retrieval of other drawings relevant to the drawing is realized. Moreover, when correction etc. occurs similarly, he performs a generation control and is trying to prevent correction of an inaccurate drawing in JP,6-83882,A.

[0004] On the other hand, when drawing up the large-scale document which combined the multi-file by two or more persons, it is constituted in the field of the documentation management in many cases so that two or more persons may read the same file or writing may become possible. When a file with one person can be written in on that occasion and it opens at it, controlling exclusively so that other persons can do only read-out is usually performed. Moreover, what reflects in all men modification to which it permitted that two or more persons accessed a shared file simultaneously to, and two or more persons carried it out further is performed so that groupware may see in recent years.

[0005] It considers applying such a function to drawing-control equipment. Namely, the act that two or more architects carry out by sharing correction of a drawing etc. When realizing on the drawing-control equipment which keeps the drawing created by the CAD system with electronic intelligence, and manages it is considered, when a certain architect posts a drawing for the objects, such as correction, like a documentation management If it controls exclusively so that other persons cannot make correction etc., it can start, and by the time all corrections are completed, correction of the next person etc. will require great time amount, until the first architect completes correction etc. Moreover, when usually making correction of the original-drawing data on drawing-control equipment etc., it once posts to each architect's workstation, usually makes correction etc. to the data, and it is not realistic that two or more architects make correction etc. to the same data. Furthermore, even if it shares data and makes correction etc. by the same view as groupware, there is a problem that contention of the content of modification occurs and conflict may occur.

[0006]

[Problem(s) to be Solved by the Invention] This invention was made in view of the situation mentioned above, and aims to let two or more architects offer the drawing-control equipment which enabled it to correct the same drawing in parallel, without the content of modification competing.

[0007]

[Means for Solving the Problem] In the drawing-control equipment which manages the drawing with which this invention was created by the CAD system An original-drawing storing means to store said drawing, and a request-modify maintenance means to hold the modification level at the time of taking out said drawing, The management tool which receives the ejection demand of said drawing, compares the modification level of this demand with the modification level currently held at said request-modify maintenance means, and takes out said drawing from said original-drawing storing means when it is not the same modification level is provided. It is characterized by constituting possible [a receptionist of two or more ejection demands from which the modification level to the same drawing differs]. Said modification level is classifiable like invention according to claim 2 according to the semantics of the content of correction or revision, or the component of a drawing.

[0008] Like invention according to claim 3, it can suspend the correction or revision of a drawing received previously, and when said management tool receives two or more correction requests to the same drawing, it can constitute it so that it may not be reflected in original-drawing data, until correction of all drawings or reception of revision is completed. At this time, a synthetic means to compound two or more corrections or revision to the same drawing is further established like invention according to claim 4. Said management tool When two or more correction requests are received to the same drawing, the correction or revision of a drawing previously received until reception of a correction request of all drawings was completed is suspended. It can constitute so that composition by said synthetic means may be performed after completing reception of a correction request of all drawings, and it may store in said original-drawing storing means.

[0009] Furthermore, like invention according to claim 5, when said management tool receives two or more correction requests to the same drawing It judges whether a correction request of the drawing received previously competes with the content of modification after it. When not competing, it can constitute so that it may be reflected in the drawing within said original-drawing storing means, without waiting for reception of a correction request of the correction or alteration based on a correction request of the drawing received previously of the drawing after it.

[0010]

[Embodiment of the Invention] Drawing 1 is the block diagram showing an example of a system including the gestalt of operation of the 1st of the drawing-control equipment of this invention. the inside of drawing, and 1 -- release-of-drawing request category side equipment and 2 -- drawing-control category side equipment and 3 -- a network and 11 -- the CC section and 12 -- the storage section and 13 -- the I/O section and 14 -- the communications control section and 15 -- a CAD system and 16 -- the demand generating section and 21 -- for the I/O section and 24, as for the original-drawing storage section and 26, the communications control section and 25 are [the CC section and 22 / the storage section and 23 / the original-drawing Management Department and 27] the request administrator sections.

[0011] As shown in drawing 1 (A), release-of-drawing request category side equipment 1 has the demand generating section 16 with the CC section 11, the storage section 12, the I/O section 13, the communications control section 14, and CAD system 15. CAD system 15 performs a plot of a CAD drawing, correction, an output, etc. Moreover, the demand generating section 16 performs the release-of-drawing demand of carried out data, such as a fetch demand of original-drawing data, or correction, to drawing-control category side equipment 2. Release-of-drawing request category side equipment 1 is connected to a network 3 if needed.

[0012] As shown in drawing 1 (B), drawing-control category side equipment 2 has the CC section 21, the storage section 22, the I/O section 23, the communications control section 24, the original-drawing storage section 25, the original-drawing Management Department 26, and the request administrator section 27. The original-drawing storage section 25 saves original-drawing data. The original-drawing Management Department 26 controls the ejection of original-drawing data, or storing to the original-drawing storage section 25. The request administrator section 27 receives the release-of-drawing demand of carried out data, such as a fetch demand of the original-drawing data from the demand

generating section 16 of release-of-drawing request category side equipment 1, or correction. Drawing-control category side equipment 2 is connected to a network 3 if needed.

[0013] Above-mentioned release-of-drawing request category side equipment 1 and drawing-control category side equipment 2 can be constituted with one or more workstations and the software mounted on them. The example of a configuration by such workstation is shown in drawing 1 (C). Drawing 1 (C) shows the configuration to which the workstation by the side of two sets of release-of-drawing request categories and the workstation by the side of one set of a drawing-control category were connected by the network 3. This configuration is an example, and the number of a workstation etc. can be changed suitably and does not necessarily need to be connected to the network 3. Moreover, a workstation and the software mounted are divided roughly into the thing in a release-of-drawing request category side, and the thing in a drawing-control category side in this example. However, you may be the configuration which it did not necessarily need to be independently depending on activity aspect, and the configuration by the side of a release-of-drawing request category and the configuration by the side of a drawing-control category were included to one workstation, and shared the intersection.

[0014] Drawing 2 is the explanatory view of an example of actuation of a system including the gestalt of operation of the 1st of the drawing-control equipment of this invention. The same sign is given to the same part as drawing 1 among drawing. 31 -- a user interface and 32 -- a processing control section and 41 -- for the request-modify check section and 44, as for a request-modify catalogued file and 46, the request-modify registration section and 45 are [the user authentication section and 42 / the drawing existence check section and 43 / the error notification section and 47] processing control sections. In this example, the demand generating section 16 of release-of-drawing request category side equipment 1 has the user interface 31 and the processing control section 32. Moreover, the request administrator section 27 of drawing-control category side equipment 2 has the user authentication section 41, the drawing existence check section 42, the request-modify check section 43, the request-modify registration section 44, the request-modify catalogued file 45, the error notification section 46, and the processing control section 47.

[0015] A user interface 31 receives each command of the original-drawing fetch demand from an architect, and a drawing release-of-drawing demand. The processing control section 32 performs a transfer of a command, and the receipt of an error notification to drawing-control category side equipment 2, it stores in the storage section 12 the original-drawing data transmitted from drawing-control category side equipment 2, and it performs starting of each part inside equipment, and control so that it may process transmitting the drawing data which carry out the release of drawing from the storage section 12 to drawing-control category side equipment 2 etc.

[0016] The user authentication section 41 attests that he is a person with the suitable architect name of the demand origin sent to drawing-control category side equipment 2. The drawing existence check section 42 detects whether the specified drawing name which has been sent to drawing-control category side equipment 2 exists as original-drawing data. As for the registration demand check section 43, a request modify detects that they are the same architect name or the same level to the drawing concerned. The request-modify registration section 44 performs registration of an architect name with a request modify, a drawing name, and modification level, and a call to the request-modify catalogued file 45. The error notification section 46 transmits the generated error to release-of-drawing request category equipment 1. The processing control section 47 makes starting of each part of the request administrator section 27 interior, control, and connection with the exterior.

[0017] Next, the actuation at the time of taking out the command of an original-drawing fetch demand to release-of-drawing request category side equipment 1 is explained. Drawing 3 is the explanatory view of an example of the display screen of an original-drawing ejection demand. The user interface 31 in the demand generating section 16 of release-of-drawing request category side equipment 1 shows an architect a directions input screen as shown in drawing 3, and receives directions. An architect inputs selection of whether to make an architect name, a password, a drawing name to take out, and correction, and the modification level at the time of correcting according to the screen display shown in drawing 3, and directs initiation.

[0018] Modification level is classified according to the semantics of the component of the contents, such as correction, or a drawing. Drawing 4 is the explanatory view of an example of modification level. In this example, 3 level of clerical error correction, attribute modification, and content correction is assumed as modification level. Each modification level is classified according to the contents, such as correction, as shown in drawing 4 . It is modification level in case clerical error correction performs clerical error correction of a NOTE sentence character. Attribute modification is the modification level in cases of performing correction and correction of the attribute of a drawing, such as a drawing name and the part number. Content correction is the modification level in the case of performing correction of the circuit diagram in a drawing itself, and making a change of the content.

[0019] Drawing 5 is the explanatory view of another example of modification level. In this example, modification level is set up according to the semantics of the component of a drawing. As shown in drawing 5 (B), in the modification level of only a text alphabetic character, the text part shown in drawing 5 (A) by surrounding by the dotted line is corrected. In the modification level of the attribute of a specific graphic form, modification and the correction of an attribute which are added to specific graphic forms, such as a drawing frame as shown in drawing 5 (A) as a "attribute", are made. In the modification level of only a label, modification and the correction of an alphabetic character which are added to the circuit diagram are made as shown as a "label" all over the circuit diagram of drawing 5 (A). In the modification level of modification of a graphic form, correction of a circuit diagram is performed and a change of the content is made. In this example, even if it is correction of an alphabetic character, it will correct with the modification level in which a text part like a notes part differs from a label part.

[0020] Of course, it is possible to set up various modification level besides the example shown in drawing 4 and drawing 5 . An architect sets up modification level in the screen shown in drawing 3 , corresponding to the activity to be done from now on. Moreover, modification level can also be constituted so that two or more level can be simultaneously chosen according to the content of correction.

[0021] If directions of initiation are made from an architect, the information inputted from release-of-drawing request category side equipment 1 to drawing-control category side equipment 2 will be transmitted to the request administrator section 27 as an original-drawing fetch demand.

[0022] Drawing 6 is a flow chart which shows an example of actuation of the request administrator section 27 of an original-drawing ejection demand. The processing control section 47 of the request administrator section 27 gives directions of the purport which performs user authentication to the user authentication section 41 in S51. The user authentication section 41 attests whether you are those to whom the sent architect name has the just access which takes out original-drawing data. The information of the rightful claimant for the authentication concerned presupposes that it is given using the information on a file and others. The result of authentication is judged in S52, and when an architect name is not suitable, the purport which is the error of user injustice is told to the error notification section 46 by S61. The following processings are continued when that is not right.

[0023] The processing control section 47 of the request administrator section 27 gives directions of the purport which carries out a drawing name's existence check to the drawing existence check section 42. The processing control section 47 detects whether the sent drawing name exists as original-drawing data. For this detection, the processing control section 47 requires the list of original-drawing data names of the original-drawing Management Department 26, and receives the list of original-drawing data names from the original-drawing Management Department 26. In S53, when it is that in which a drawing name does not exist as original-drawing data as a result of detection, the purport which is the error of drawing name injustice is told to the error notification section 46 by S61. The following processings are continued when that is not right.

[0024] The processing control section 47 of the request administrator section 27 receives the request-modify check section 43 in S54. When the request modify to the sent original-drawing data of a drawing name already exists and a request modify already exists [or] further When [whose request modify concerned is not / whether the correction claimant concerned is contained in a registered architect, and /

a registered architect further] it is a person, directions of the purport which detects whether the modification level at said time of correcting is the same are given. For this detection, the processing control section 47 requires the list of registered architects in the request-modify catalogued file 45 from the request-modify registration section 44, and receives the list of registered architects from the request-modify registration section 44. When the request modify to the original-drawing data of a drawing name does not exist yet in S55 as a result of this detection, processing of the request-modify registration after S58 is continued. A request modify already exists, and when a correction claimant is a registered architect in S56, registration duplication error ***** is told to the error notification section 46 by S61. Furthermore, a request modify already exists, and not in a registered architect but in S57, the correction claimant concerned tells level duplication error ***** to the error notification section 46 by S61, when modification level is the same. When that is not right, processing of the request-modify registration described below is continued.

[0025] When a request modify is judged to be an appropriate thing, in S58, the processing control section 47 of the request administrator section 27 gives directions of the purport which registers the request modify concerned to the request-modify registration section 44. The request-modify registration section 44 registers a request modify into the request-modify catalogued file 45. Furthermore, the processing control section 47 of the request administrator section 27 gives directions of the purport which transmits the original-drawing data of a drawing name sent to the original-drawing Management Department 24 in S59, and the original-drawing Management Department 24 transmits the original-drawing data concerned from the original-drawing storage section 25 to release-of-drawing request category side equipment 1 in S60.

[0026] The original-drawing data transmitted to release-of-drawing request category side equipment 1 are stored in storage 12 by the processing control section 32 of the demand generating section 16. An architect can perform correction etc. now for original-drawing data to ejection and original-drawing data through the above processing.

[0027] In addition, by considering that this is correction of the request modify which already exists, deleting the request modify which already exists and transposing it to the sent request modify, when the claimant of the sent request modify is contained in the registered architect in S56 of drawing 6 , you may constitute so that deletion and correction of a request modify can be performed.

[0028] Next, the actuation at the time of taking out the command of a drawing release-of-drawing demand to release-of-drawing request category side equipment 1 is explained. Drawing 7 is the explanatory view of an example of the display screen of a release-of-drawing demand. According to a directions input screen as shown in drawing 7 , an architect inputs an architect name, a password, and a drawing name to carry out the release of drawing, and directs initiation. Then, information, such as the architect name and password which were entered from release-of-drawing request category side equipment 1 to drawing-control category side equipment 2, and a drawing name, is transmitted to the request administrator section 27 as a drawing release-of-drawing demand.

[0029] Drawing 8 is a flow chart which shows an example of actuation of the request administrator section 27 of a release-of-drawing demand. The processing control section 47 of the request administrator section 27 gives directions of the purport which performs user authentication to the user authentication section 41 in S71, and the user authentication section 41 attests whether you are those to whom the sent architect name has the just access which performs the release of drawing. The information of the rightful claimant for the authentication concerned presupposes that it is given using the information on a file and others. In S72, as a result of authentication, when an architect name is not suitable, the purport which is the error of user injustice is told to the error notification section 46 by S78. The following processings are continued when that is not right.

[0030] The processing control section 47 of the request administrator section 27 gives directions of the purport which detects whether it is that in which the request modify to the original-drawing data of a drawing name sent to the request-modify check section 43 already exists in S73. For this detection, the processing control section 47 requires the list of registered architects in the request-modify catalogued file 45 from the request-modify registration section 44, and receives the list of registered architects from

the request-modify registration section 44. In S74, when the request modify to the sent original-drawing data of a drawing name does not exist as a result of this detection, since the drawing which is going to carry out the release of drawing is that by which the request modify is not made, it tells non-registered error ***** to the error notification section 46 by S78. The following processings are continued when that is not right.

[0031] When a release-of-drawing demand is judged to be an appropriate thing by processing to S74, in S75, the processing control section 47 of the request administrator section 27 gives directions of the purport which transmits drawing data to the original-drawing Management Department 24 from release-of-drawing request category side equipment 1, and the original-drawing Management Department 24 stores drawing data in the original-drawing storage section 25 as original-drawing data in S76.

Furthermore, the processing control section 47 of the request administrator section 27 gives directions of the purport which deletes the request modify concerned to the request-modify registration section 44 in S77. The request-modify registration section 44 deletes said request modify from the request-modify catalogued file 45.

[0032] Thus, if modification level does not lap with one drawing in the case of the ejection of original-drawing data, the ejection of the original-drawing data in each modification level, correction, and the release of drawing can be performed in parallel. Thereby, it becomes correctable [the drawing by two or more persons], without causing contention.

[0033] In addition, when a release-of-drawing request of the drawing data which corrected the same page from release-of-drawing request category side [2 or more] equipment 1 when ejection of two or more original-drawing data was performed to the same drawing is received, only the drawing data which were overwritten and carried out the release-of-drawing demand at the last may remain. In order to avoid such a situation, the original-drawing Management Department 26 suspends the correction or revision of a drawing received previously, and is made not to be reflected in original-drawing data until reception of all release-of-drawing demands is completed. When correction of the overlapping page exists after receiving all release-of-drawing demands, it can constitute so that it may tell the release-of-drawing request category side equipment which made the correction which a page overlaps in that, and no release-of-drawing demands may be received or only one may be chosen and received. Of course, what is necessary is not to perform such processing but just to store the drawing data of a correction page in the order which the release-of-drawing demand suited at the original-drawing storage section 25, when it is clear not to correct the same page.

[0034] Drawing 9 is the explanatory view of an example of actuation of a system including the gestalt of operation of the 2nd of the drawing-control equipment of this invention. Among drawing, the same sign is given to the same part as drawing 2, and explanation is omitted. 81 is the memory section and 82 is the synthetic section. With the configuration of the gestalt of the 1st operation of a ****, although it is correctable in parallel to the page from which the same drawing differs, if it corrects to the same page and the release of drawing is performed, only the data which it was overwritten in order and carried out the release of drawing to the last may remain. Therefore, with the gestalt of this 2nd operation, when correction of level which is different to the same page occurs, it prevents that drawing data will be overwritten and the configuration which enabled it to also make correction of the same page in parallel is shown.

[0035] Drawing-control category side equipment 2 has the memory section 81 and the synthetic section 82 further. The memory section 81 holds temporarily drawing data with a release-of-drawing demand. The synthetic section 82 compounds two or more drawing data by which the release of drawing was carried out, and creates the drawing data which include all the contents of correction.

[0036] Actuation of the ejection of the original-drawing data in the gestalt of this 2nd operation is the same as that of the case of the gestalt of the 1st operation of a ****. At the time of the release of drawing, the drawing data by which the release of drawing was carried out are once stored in the memory section 81 rather than are stored in the direct original-drawing storage section 25. If there are all release-of-drawing requests from the release-of-drawing request category equipment 1 which was making correction in parallel and all the drawing data to the drawing concerned are stored in the

memory section 81, only the data which are the page which had two or more requests modify in the same page will create the drawing data which include all corrections by the synthetic section 82. And the drawing data after composition are stored in the original-drawing storage section 25. Thus, two or more persons can correct in parallel to the same page, and each content of correction can be reflected in original-drawing data even in such a case. Even when compounding drawing data like the gestalt of this 2nd operation, the correction with the same modification level is not permitted. Thereby, the situation where a different content of correction over the same part is compounded can be prevented.

[0037] In addition, when it is clear not to compete with the release-of-drawing demand which the release-of-drawing demand received previously receives after it, the received release-of-drawing demand may be processed without suspending until all release-of-drawing demands gather, and you may constitute so that it may store in the original-drawing storage section 25 and may go.

[0038]

[Effect of the Invention] According to this invention, the element on a CAD drawing is received so that clearly from the above explanation. By performing the level division classified according to the semantics of the content of correction or revision, or the component of a drawing, registering said level, in case original-drawing data are corrected or revised, and restricting the correction or revision in the same level Two or more persons can perform correction or revision of a drawing in parallel, without causing contention of the content of modification.

[0039] Moreover, when two or more correction requests occur to the same page of a drawing, the correction to the same page can be made in parallel by compounding and reflecting those corrections. Since the correction by the same modification level is forbidden at this time, it is effective in the ability to prevent contention of the content of modification.

[Translation done.]

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DRAWINGS

[Drawing 3]

原図の取出し	
ユーザ名	<input type="text"/>
パスワード	<input type="text"/>
図面名(番号)	<input type="text"/>
修正	<input type="button" value="する"/> <input type="button" value="しない"/>
修正レベル	<input type="button" value="誤記訂正"/> <input type="button" value="属性変更"/> <input type="button" value="内容修正"/>
<input type="button" value="開始"/> <input type="button" value="取消し"/>	

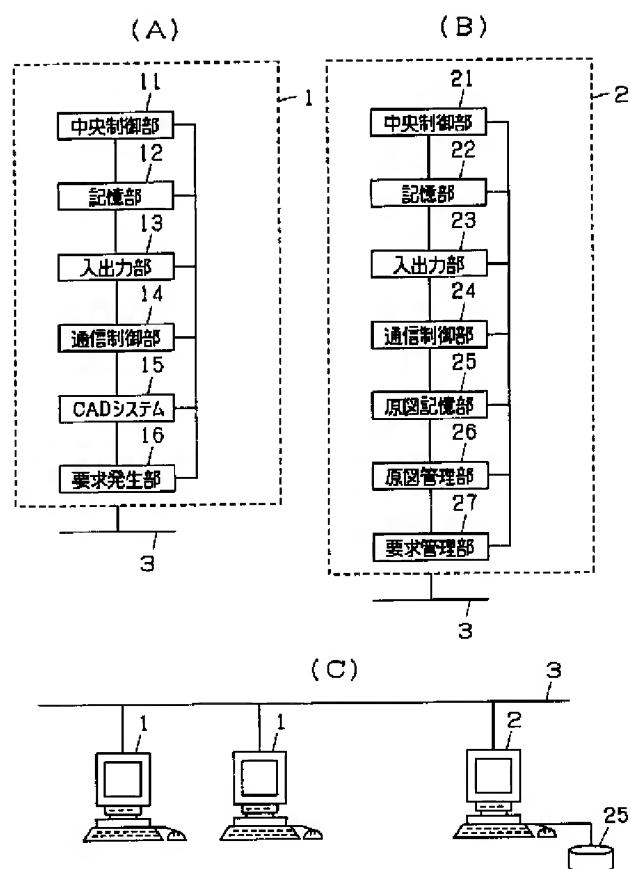
[Drawing 4]

修正レベル	修正内容
誤記訂正	注記文字の誤記訂正
属性変更	図面名・部品番号等図面の属性の修正・訂正
内容修正	回路図の修正・内容変更

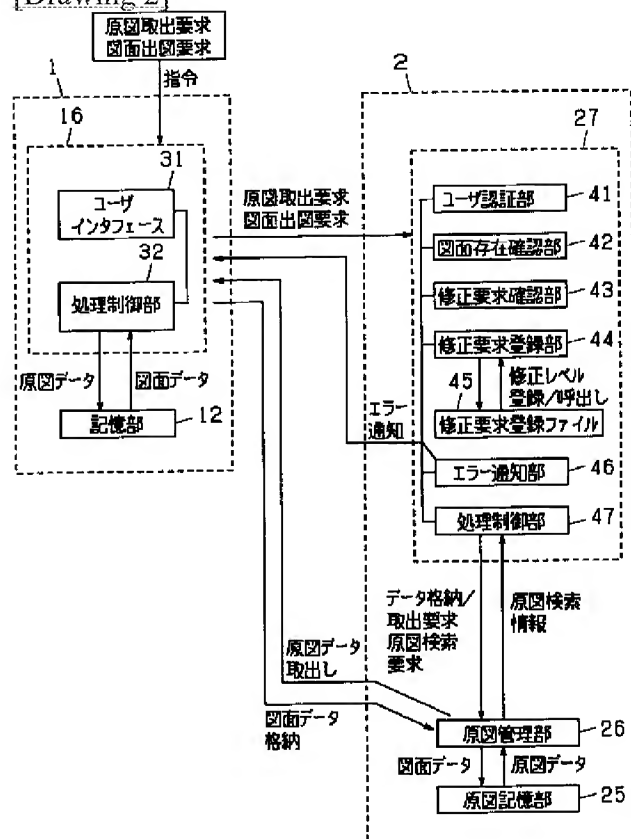
[Drawing 7]

図面の出図	
ユーザ名	<input type="text"/>
パスワード	<input type="text"/>
図面名(番号)	<input type="text"/>
<input type="button" value="開始"/> <input type="button" value="取消"/>	

[Drawing 1]

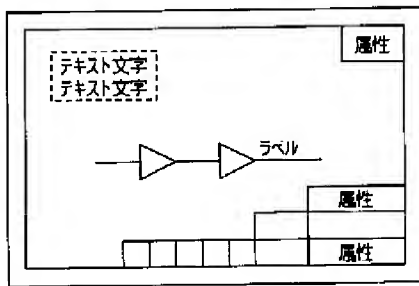


[Drawing 2]



[Drawing 5]

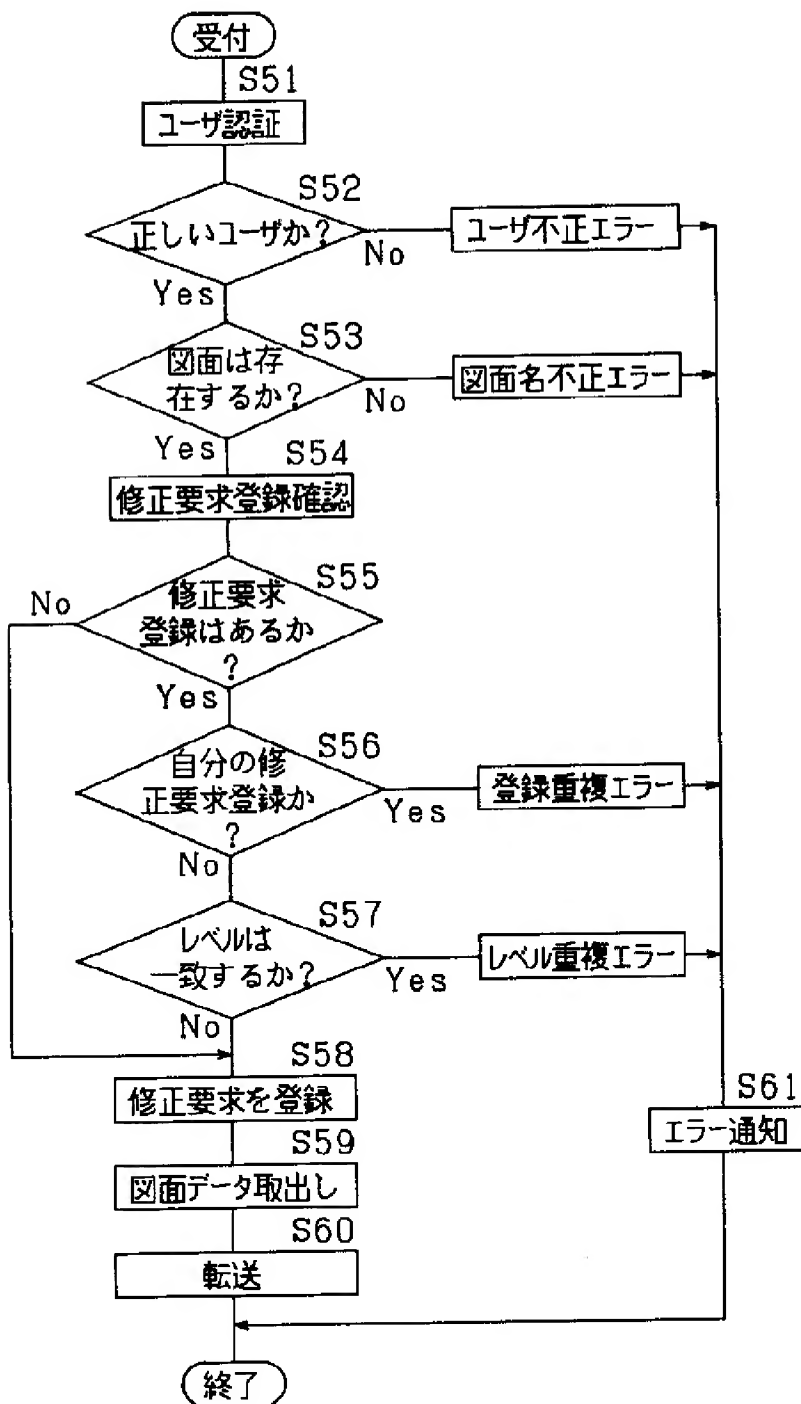
(A)



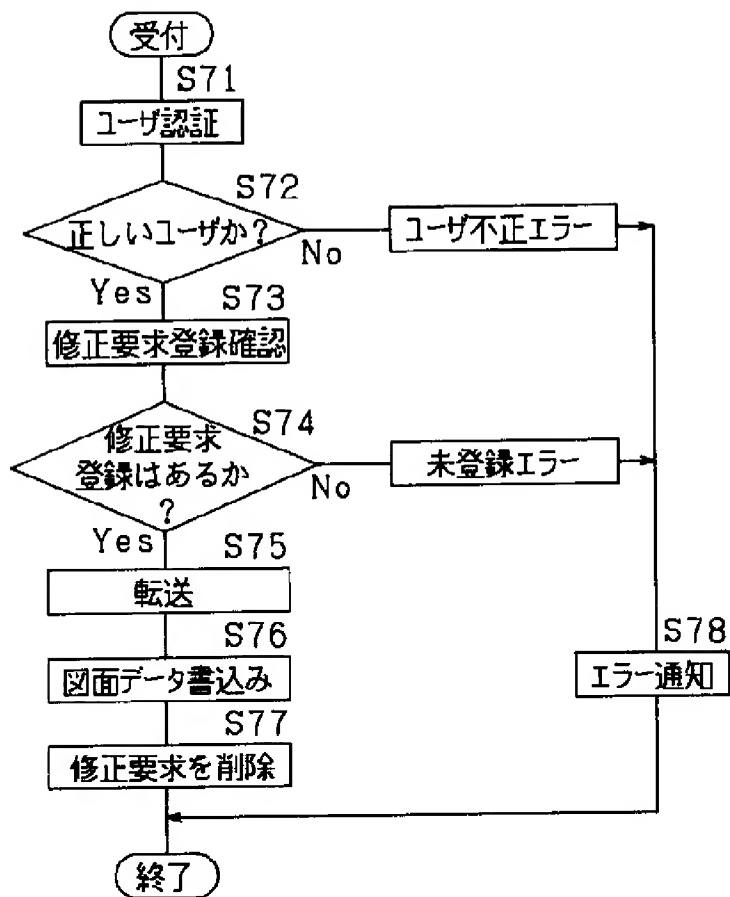
(B)

修正レベル	修正内容
テキスト文字のみ	テキスト文字のみの変更・修正
特定図形の属性	図面特等の特定の図形に付加されている属性の変更・修正
ラベルのみ	回路に付加されている文字の変更・修正
図形の変更	回路図の修正・内容変更

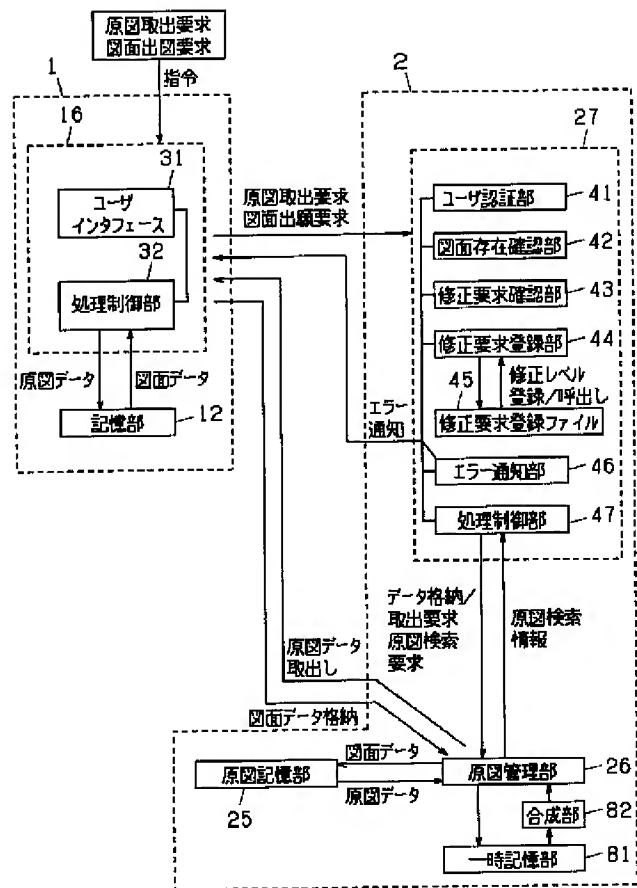
[Drawing 6]



[Drawing 8]



[Drawing 9]



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EFFECT OF THE INVENTION

[Effect of the Invention] According to this invention, the element on a CAD drawing is received so that clearly from the above explanation. By performing the level division classified according to the semantics of the content of correction or revision, or the component of a drawing, registering said level, in case original-drawing data are corrected or revised, and restricting the correction or revision in the same level Two or more persons can perform correction or revision of a drawing in parallel, without causing contention of the content of modification.

[0039] Moreover, when two or more correction requests occur to the same page of a drawing, the correction to the same page can be made in parallel by compounding and reflecting those corrections. Since the correction by the same modification level is forbidden at this time, it is effective in the ability to prevent contention of the content of modification.

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MEANS

[Means for Solving the Problem] In the drawing-control equipment which manages the drawing with which this invention was created by the CAD system An original-drawing storing means to store said drawing, and a request-modify maintenance means to hold the modification level at the time of taking out said drawing, The management tool which receives the ejection demand of said drawing, compares the modification level of this demand with the modification level currently held at said request-modify maintenance means, and takes out said drawing from said original-drawing storing means when it is not the same modification level is provided. It is characterized by constituting possible [a receptionist of two or more ejection demands from which the modification level to the same drawing differs]. Said modification level is classifiable like invention according to claim 2 according to the semantics of the content of correction or revision, or the component of a drawing.

[0008] Like invention according to claim 3, it can suspend the correction or revision of a drawing received previously, and when said management tool receives two or more correction requests to the same drawing, it can constitute it so that it may not be reflected in original-drawing data, until correction of all drawings or reception of revision is completed. At this time, a synthetic means to compound two or more corrections or revision to the same drawing is further established like invention according to claim 4. Said management tool When two or more correction requests are received to the same drawing, the correction or revision of a drawing previously received until reception of a correction request of all drawings was completed is suspended. It can constitute so that composition by said synthetic means may be performed after completing reception of a correction request of all drawings, and it may store in said original-drawing storing means.

[0009] Furthermore, like invention according to claim 5, when said management tool receives two or more correction requests to the same drawing It judges whether a correction request of the drawing received previously competes with the content of modification after it. When not competing, it can constitute so that it may be reflected in the drawing within said original-drawing storing means, without waiting for reception of a correction request of the correction or alteration based on a correction request of the drawing received previously of the drawing after it.

[0010]

[Embodiment of the Invention] Drawing 1 is the block diagram showing an example of a system including the gestalt of operation of the 1st of the drawing-control equipment of this invention. the inside of drawing, and 1 -- release-of-drawing request category side equipment and 2 -- drawing-control category side equipment and 3 -- a network and 11 -- the CC section and 12 -- the storage section and 13 -- the I/O section and 14 -- the communications control section and 15 -- a CAD system and 16 -- the demand generating section and 21 -- for the I/O section and 24, as for the original-drawing storage section and 26, the communications control section and 25 are [the CC section and 22 / the storage section and 23 / the original-drawing Management Department and 27] the request administrator sections.

[0011] As shown in drawing 1 (A), release-of-drawing request category side equipment 1 has the demand generating section 16 with the CC section 11, the storage section 12, the I/O section 13, the

communications control section 14, and CAD system 15. CAD system 15 performs a plot of a CAD drawing, correction, an output, etc. Moreover, the demand generating section 16 performs the release-of-drawing demand of carried out data, such as a fetch demand of original-drawing data, or correction, to drawing-control category side equipment 2. Release-of-drawing request category side equipment 1 is connected to a network 3 if needed.

[0012] As shown in drawing 1 (B), drawing-control category side equipment 2 has the CC section 21, the storage section 22, the I/O section 23, the communications control section 24, the original-drawing storage section 25, the original-drawing Management Department 26, and the request administrator section 27. The original-drawing storage section 25 saves original-drawing data. The original-drawing Management Department 26 controls the ejection of original-drawing data, or storing to the original-drawing storage section 25. The request administrator section 27 receives the release-of-drawing demand of carried out data, such as a fetch demand of the original-drawing data from the demand generating section 16 of release-of-drawing request category side equipment 1, or correction. Drawing-control category side equipment 2 is connected to a network 3 if needed.

[0013] Above-mentioned release-of-drawing request category side equipment 1 and drawing-control category side equipment 2 can be constituted with one or more workstations and the software mounted on them. The example of a configuration by such workstation is shown in drawing 1 (C). Drawing 1 (C) shows the configuration to which the workstation by the side of two sets of release-of-drawing request categories and the workstation by the side of one set of a drawing-control category were connected by the network 3. This configuration is an example, and the number of a workstation etc. can be changed suitably and does not necessarily need to be connected to the network 3. Moreover, a workstation and the software mounted are divided roughly into the thing in a release-of-drawing request category side, and the thing in a drawing-control category side in this example. However, you may be the configuration which it did not necessarily need to be independently depending on activity aspect, and the configuration by the side of a release-of-drawing request category and the configuration by the side of a drawing-control category were included to one workstation, and shared the intersection.

[0014] Drawing 2 is the explanatory view of an example of actuation of a system including the gestalt of operation of the 1st of the drawing-control equipment of this invention. The same sign is given to the same part as drawing 1 among drawing. 31 -- a user interface and 32 -- a processing control section and 41 -- for the request-modify check section and 44, as for a request-modify catalogued file and 46, the request-modify registration section and 45 are [the user authentication section and 42 / the drawing existence check section and 43 / the error notification section and 47] processing control sections. In this example, the demand generating section 16 of release-of-drawing request category side equipment 1 has the user interface 31 and the processing control section 32. Moreover, the request administrator section 27 of drawing-control category side equipment 2 has the user authentication section 41, the drawing existence check section 42, the request-modify check section 43, the request-modify registration section 44, the request-modify catalogued file 45, the error notification section 46, and the processing control section 47.

[0015] A user interface 31 receives each command of the original-drawing fetch demand from an architect, and a drawing release-of-drawing demand. The processing control section 32 performs a transfer of a command, and the receipt of an error notification to drawing-control category side equipment 2, it stores in the storage section 12 the original-drawing data transmitted from drawing-control category side equipment 2, and it performs starting of each part inside equipment, and control so that it may process transmitting the drawing data which carry out the release of drawing from the storage section 12 to drawing-control category side equipment 2 etc.

[0016] The user authentication section 41 attests that he is a person with the suitable architect name of the demand origin sent to drawing-control category side equipment 2. The drawing existence check section 42 detects whether the specified drawing name which has been sent to drawing-control category side equipment 2 exists as original-drawing data. As for the registration demand check section 43, a request modify detects that they are the same architect name or the same level to the drawing concerned. The request-modify registration section 44 performs registration of an architect name with a request

modify, a drawing name, and modification level, and a call to the request-modify catalogued file 45. The error notification section 46 transmits the generated error to release-of-drawing request category equipment 1. The processing control section 47 makes starting of each part of the request administrator section 27 interior, control, and connection with the exterior.

[0017] Next, the actuation at the time of taking out the command of an original-drawing fetch demand to release-of-drawing request category side equipment 1 is explained. Drawing 3 is the explanatory view of an example of the display screen of an original-drawing ejection demand. The user interface 31 in the demand generating section 16 of release-of-drawing request category side equipment 1 shows an architect a directions input screen as shown in drawing 3, and receives directions. An architect inputs selection of whether to make an architect name, a password, a drawing name to take out, and correction, and the modification level at the time of correcting according to the screen display shown in drawing 3, and directs initiation.

[0018] Modification level is classified according to the semantics of the component of the contents, such as correction, or a drawing. Drawing 4 is the explanatory view of an example of modification level. In this example, 3 level of clerical error correction, attribute modification, and content correction is assumed as modification level. Each modification level is classified according to the contents, such as correction, as shown in drawing 4. It is modification level in case clerical error correction performs clerical error correction of a NOTE sentence character. Attribute modification is the modification level in cases of performing correction and correction of the attribute of a drawing, such as a drawing name and the part number. Content correction is the modification level in the case of performing correction of the circuit diagram in a drawing itself, and making a change of the content.

[0019] Drawing 5 is the explanatory view of another example of modification level. In this example, modification level is set up according to the semantics of the component of a drawing. As shown in drawing 5 (B), in the modification level of only a text alphabetic character, the text part shown in drawing 5 (A) by surrounding by the dotted line is corrected. In the modification level of the attribute of a specific graphic form, modification and the correction of an attribute which are added to specific graphic forms, such as a drawing frame as shown in drawing 5 (A) as a "attribute", are made. In the modification level of only a label, modification and the correction of an alphabetic character which are added to the circuit diagram are made as shown as a "label" all over the circuit diagram of drawing 5 (A). In the modification level of modification of a graphic form, correction of a circuit diagram is performed and a change of the content is made. In this example, even if it is correction of an alphabetic character, it will correct with the modification level in which a text part like a notes part differs from a label part.

[0020] Of course, it is possible to set up various modification level besides the example shown in drawing 4 and drawing 5. An architect sets up modification level in the screen shown in drawing 3, corresponding to the activity to be done from now on. Moreover, modification level can also be constituted so that two or more level can be simultaneously chosen according to the content of correction.

[0021] If directions of initiation are made from an architect, the information inputted from release-of-drawing request category side equipment 1 to drawing-control category side equipment 2 will be transmitted to the request administrator section 27 as an original-drawing fetch demand.

[0022] Drawing 6 is a flow chart which shows an example of actuation of the request administrator section 27 of an original-drawing ejection demand. The processing control section 47 of the request administrator section 27 gives directions of the purport which performs user authentication to the user authentication section 41 in S51. The user authentication section 41 attests whether you are those to whom the sent architect name has the just access which takes out original-drawing data. The information of the rightful claimant for the authentication concerned presupposes that it is given using the information on a file and others. The result of authentication is judged in S52, and when an architect name is not suitable, the purport which is the error of user injustice is told to the error notification section 46 by S61. The following processings are continued when that is not right.

[0023] The processing control section 47 of the request administrator section 27 gives directions of the

purport which carries out a drawing name's existence check to the drawing existence check section 42. The processing control section 47 detects whether the sent drawing name exists as original-drawing data. For this detection, the processing control section 47 requires the list of original-drawing data names of the original-drawing Management Department 26, and receives the list of original-drawing data names from the original-drawing Management Department 26. In S53, when it is that in which a drawing name does not exist as original-drawing data as a result of detection, the purport which is the error of drawing name injustice is told to the error notification section 46 by S61. The following processings are continued when that is not right.

[0024] The processing control section 47 of the request administrator section 27 receives the request-modify check section 43 in S54. When the request modify to the sent original-drawing data of a drawing name already exists and a request modify already exists [or] further When [whose request modify concerned is not / whether the correction claimant concerned is contained in a registered architect, and / a registered architect further] it is a person, directions of the purport which detects whether the modification level at said time of correcting is the same are given. For this detection, the processing control section 47 requires the list of registered architects in the request-modify catalogued file 45 from the request-modify registration section 44, and receives the list of registered architects from the request-modify registration section 44. When the request modify to the original-drawing data of a drawing name does not exist yet in S55 as a result of this detection, processing of the request-modify registration after S58 is continued. A request modify already exists, and when a correction claimant is a registered architect in S56, registration duplication error ***** is told to the error notification section 46 by S61. Furthermore, a request modify already exists, and not in a registered architect but in S57, the correction claimant concerned tells level duplication error ***** to the error notification section 46 by S61, when modification level is the same. When that is not right, processing of the request-modify registration described below is continued.

[0025] When a request modify is judged to be an appropriate thing, in S58, the processing control section 47 of the request administrator section 27 gives directions of the purport which registers the request modify concerned to the request-modify registration section 44. The request-modify registration section 44 registers a request modify into the request-modify catalogued file 45. Furthermore, the processing control section 47 of the request administrator section 27 gives directions of the purport which transmits the original-drawing data of a drawing name sent to the original-drawing Management Department 24 in S59, and the original-drawing Management Department 24 transmits the original-drawing data concerned from the original-drawing storage section 25 to release-of-drawing request category side equipment 1 in S60.

[0026] The original-drawing data transmitted to release-of-drawing request category side equipment 1 are stored in storage 12 by the processing control section 32 of the demand generating section 16. An architect can perform correction etc. now for original-drawing data to ejection and original-drawing data through the above processing.

[0027] In addition, by considering that this is correction of the request modify which already exists, deleting the request modify which already exists and transposing it to the sent request modify, when the claimant of the sent request modify is contained in the registered architect in S56 of drawing 6 , you may constitute so that deletion and correction of a request modify can be performed.

[0028] Next, the actuation at the time of taking out the command of a drawing release-of-drawing demand to release-of-drawing request category side equipment 1 is explained. Drawing 7 is the explanatory view of an example of the display screen of a release-of-drawing demand. According to a directions input screen as shown in drawing 7 , an architect inputs an architect name, a password, and a drawing name to carry out the release of drawing, and directs initiation. Then, information, such as the architect name and password which were entered from release-of-drawing request category side equipment 1 to drawing-control category side equipment 2, and a drawing name, is transmitted to the request administrator section 27 as a drawing release-of-drawing demand.

[0029] Drawing 8 is a flow chart which shows an example of actuation of the request administrator section 27 of a release-of-drawing demand. The processing control section 47 of the request

administrator section 27 gives directions of the purport which performs user authentication to the user authentication section 41 in S71, and the user authentication section 41 attests whether you are those to whom the sent architect name has the just access which performs the release of drawing. The information of the rightful claimant for the authentication concerned presupposes that it is given using the information on a file and others. In S72, as a result of authentication, when an architect name is not suitable, the purport which is the error of user injustice is told to the error notification section 46 by S78. The following processings are continued when that is not right.

[0030] The processing control section 47 of the request administrator section 27 gives directions of the purport which detects whether it is that in which the request modify to the original-drawing data of a drawing name sent to the request-modify check section 43 already exists in S73. For this detection, the processing control section 47 requires the list of registered architects in the request-modify catalogued file 45 from the request-modify registration section 44, and receives the list of registered architects from the request-modify registration section 44. In S74, when the request modify to the sent original-drawing data of a drawing name does not exist as a result of this detection, since the drawing which is going to carry out the release of drawing is that by which the request modify is not made, it tells non-registered error ***** to the error notification section 46 by S78. The following processings are continued when that is not right.

[0031] When a release-of-drawing demand is judged to be an appropriate thing by processing to S74, in S75, the processing control section 47 of the request administrator section 27 gives directions of the purport which transmits drawing data to the original-drawing Management Department 24 from release-of-drawing request category side equipment 1, and the original-drawing Management Department 24 stores drawing data in the original-drawing storage section 25 as original-drawing data in S76.

Furthermore, the processing control section 47 of the request administrator section 27 gives directions of the purport which deletes the request modify concerned to the request-modify registration section 44 in S77. The request-modify registration section 44 deletes said request modify from the request-modify catalogued file 45.

[0032] Thus, if modification level does not lap with one drawing in the case of the ejection of original-drawing data, the ejection of the original-drawing data in each modification level, correction, and the release of drawing can be performed in parallel. Thereby, it becomes correctable [the drawing by two or more persons], without causing contention.

[0033] In addition, when a release-of-drawing request of the drawing data which corrected the same page from release-of-drawing request category side [2 or more] equipment 1 when ejection of two or more original-drawing data was performed to the same drawing is received, only the drawing data which were overwritten and carried out the release-of-drawing demand at the last may remain. In order to avoid such a situation, the original-drawing Management Department 26 suspends the correction or revision of a drawing received previously, and is made not to be reflected in original-drawing data until reception of all release-of-drawing demands is completed. When correction of the overlapping page exists after receiving all release-of-drawing demands, it can constitute so that it may tell the release-of-drawing request category side equipment which made the correction which a page overlaps in that, and no release-of-drawing demands may be received or only one may be chosen and received. Of course, what is necessary is not to perform such processing but just to store the drawing data of a correction page in the order which the release-of-drawing demand suited at the original-drawing storage section 25, when it is clear not to correct the same page.

[0034] Drawing 9 is the explanatory view of an example of actuation of a system including the gestalt of operation of the 2nd of the drawing-control equipment of this invention. Among drawing, the same sign is given to the same part as drawing 2, and explanation is omitted. 81 is the memory section and 82 is the synthetic section. With the configuration of the gestalt of the 1st operation of a ****, although it is correctable in parallel to the page from which the same drawing differs, if it corrects to the same page and the release of drawing is performed, only the data which it was overwritten in order and carried out the release of drawing to the last may remain. Therefore, with the gestalt of this 2nd operation, when correction of level which is different to the same page occurs, it prevents that drawing data will be

overwritten and the configuration which enabled it to also make correction of the same page in parallel is shown.

[0035] Drawing-control category side equipment 2 has the memory section 81 and the synthetic section 82 further. The memory section 81 holds temporarily drawing data with a release-of-drawing demand. The synthetic section 82 compounds two or more drawing data by which the release of drawing was carried out, and creates the drawing data which include all the contents of correction.

[0036] Actuation of the ejection of the original-drawing data in the gestalt of this 2nd operation is the same as that of the case of the gestalt of the 1st operation of a ****. At the time of the release of drawing, the drawing data by which the release of drawing was carried out are once stored in the memory section 81 rather than are stored in the direct original-drawing storage section 25. If there are all release-of-drawing requests from the release-of-drawing request category equipment 1 which was making correction in parallel and all the drawing data to the drawing concerned are stored in the memory section 81, only the data which are the page which had two or more requests modify in the same page will create the drawing data which include all corrections by the synthetic section 82. And the drawing data after composition are stored in the original-drawing storage section 25. Thus, two or more persons can correct in parallel to the same page, and each content of correction can be reflected in original-drawing data even in such a case. Even when compounding drawing data like the gestalt of this 2nd operation, the correction with the same modification level is not permitted. Thereby, the situation where a different content of correction over the same part is compounded can be prevented.

[0037] In addition, when it is clear not to compete with the release-of-drawing demand which the release-of-drawing demand received previously receives after it, the received release-of-drawing demand may be processed without suspending until all release-of-drawing demands gather, and you may constitute so that it may store in the original-drawing storage section 25 and may go.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] In recent years, by development of a CAD system etc., a plot activity is done using a CAD system, and it is also coming to perform the management with electronic intelligence. Therefore, the relation between drawings can also be managed by electronic intelligence. There is [the drawing by which the release of drawing was carried out is only held and is not only managed, but] correction or a case where it is revised (henceforth correction etc.) later, and drawing-control equipment needs to correspond to this.

[0003] For example, in JP,4-225473,A, when correction etc. is made to a drawing, the function which carries out automatic retrieval of other drawings relevant to the drawing is realized. Moreover, when correction etc. occurs similarly, he performs a generation control and is trying to prevent correction of an inaccurate drawing in JP,6-83882,A.

[0004] On the other hand, when drawing up the large-scale document which combined the multi-file by two or more persons, it is constituted in the field of the documentation management in many cases so that two or more persons may read the same file or writing may become possible. When a file with one person can be written in on that occasion and it opens at it, controlling exclusively so that other persons can do only read-out is usually performed. Moreover, what reflects in all men modification to which it permitted that two or more persons accessed a shared file simultaneously to, and two or more persons carried it out further is performed so that groupware may see in recent years.

[0005] It considers applying such a function to drawing-control equipment. Namely, the act that two or more architects carry out by sharing correction of a drawing etc. When realizing on the drawing-control equipment which keeps the drawing created by the CAD system with electronic intelligence, and manages it is considered, when a certain architect posts a drawing for the objects, such as correction, like a documentation management If it controls exclusively so that other persons cannot make correction etc., it can start, and by the time all corrections are completed, correction of the next person etc. will require great time amount, until the first architect completes correction etc. Moreover, when usually making correction of the original-drawing data on drawing-control equipment etc., it once posts to each architect's workstation, usually makes correction etc. to the data, and it is not realistic that two or more architects make correction etc. to the same data. Furthermore, even if it shares data and makes correction etc. by the same view as groupware, there is a problem that contention of the content of modification occurs and conflict may occur.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention keeps the drawing created by the CAD (computer-aided design) system with electronic intelligence, and relates to the drawing-control equipment to manage.

[Translation done.]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention was made in view of the situation mentioned above, and aims to let two or more architects offer the drawing-control equipment which enabled it to correct the same drawing in parallel, without the content of modification competing.

[Translation done.]